

**SUBSTITUTE SPECIFICATION**

5

PATENT

INSTITUT FRANÇAIS DU PETROLE

**METHOD FOR DETERMINING A SEISMIC WAVE VELOCITY MODEL  
IN A HETEROGENEOUS UNDERGROUND FORMATION**Inventor: Karine BROTO

10

**ABSTRACT**

A method for determining a velocity model of seismic waves picked up by seismic receivers coupled with an underground formation, in response to the emission of seismic waves in the subsoil by a seismic source, after reflection on geologic interfaces of the formation, from multi-offset records of these waves is disclosed. From picking the seismic records of one or more events for different source-pickup pairs associated with the weakest offset of a seismic acquisition device, the geometry of the events is predicted for the total range of offsets of the acquisition device and for different velocity values taken around a reference layer velocity, by means of kinematic inversion and modelling techniques. Then, for different lateral positions of the acquisition device, the predicted travel time curve best approaching the seismic event considered is selected. The travel times thus obtained are then supplied to a prestack inversion method such as a travel time tomography.